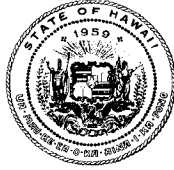


BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII



BRUCE S. ANDERSON, Ph.D., M.P.H.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HAWAII 96801

In reply, please refer to:
File:

June 9, 1999

To All Interested Parties:

SUBJECT: 1998 GROUNDWATER CONTAMINATION MAPS FOR THE
STATE OF HAWAII

Since August 1989, the Department of Health has been issuing the Groundwater Contamination Maps for the State of Hawaii. These maps identify locations where groundwater contaminants have been detected and confirmed.

We are enclosing information pertaining to the major health effects related to these contaminants. We emphasize that the detected levels reported in the maps are below existing Federal and State drinking water standards established for the protection of public health. Before contaminant levels reach these standards, we take appropriate public health protection measures.

The data presented in the maps and tables were collected between October 1996 through December 1998. Positive results are considered confirmed when verified by a different test or by the validation of historical data.

If you have any questions or would like to obtain additional information related to groundwater contamination, please contact the Groundwater Protection Program, Safe Drinking Water Branch, at (808) 586-4258.

Sincerely,

A handwritten signature in black ink, appearing to read "Bruce S. Anderson", is written over a horizontal line.

BRUCE S. ANDERSON, Ph.D., M.P.H.
Director of Health

Enclosures

The Groundwater Contamination Maps for the State of Hawaii, 1998

Purpose

The Groundwater Contamination Maps identify organic chemical contaminants that have been detected and confirmed in wells used for drinking water, irrigation, and industrial purposes throughout the State. Groundwater can become contaminated through natural processes, but anthropogenic or human-induced contamination poses more serious problems. Contaminants may come from herbicides, pesticides, industrial solvents, and other sources applied, spilled, or leaked into the ground. Groundwater contamination is a significant concern because nearly all of Hawaii's drinking water comes from groundwater sources.

The intent of the maps is to identify only those wells with detectable levels of groundwater contamination. Some contaminated wells may not be reported because of the lack of confirmed data or wells have not been tested. The contamination levels in this document refer to reported levels of contamination on a specific sampling date. Levels of groundwater contamination may fluctuate for a number of reasons, including actual diminishing or increasing levels of contamination, chemical breakdown of contaminants, variability in sampling and analytical methods, the effects of pumping rates, and other factors.

Contents

This report consists of maps and tables for the islands of Kauai, Oahu, Maui, Molokai, Lanai, and Hawaii. The maps identify the locations of current and historic contaminated wells and wellfields (an area where many wells in proximity share the same groundwater source). The tables relate information about the contaminated well, such as the use of the well (e.g., drinking water, irrigation, industrial or unused), the contaminant detected, the concentration of the contaminant (e.g., detected level), the sampling date when contamination was detected, and drinking water standards and health risks associated with each contaminant. In cases where wellfields are identified, the well or pump in that wellfield with the highest concentration of a contaminant is reported.

Separate tables were prepared for wells that have updated monitoring information and for those that do not have current available information. This provides a better understanding of the contaminants presently being detected and their location. Historic information provides insight about contaminants detected and differences in past analytical methodologies, especially prior to established state and federal standards.

A contaminant which has been identified in prior editions will be removed from the report if subsequent monitoring no longer shows detection. A well will be removed from the map if it does not show any detectable concentrations of contamination. But a well and associated contaminant(s) will remain on the map until new information confirms that concentrations have decreased to non-detectable levels. This is the case with several non-drinking water wells in this report that are not monitored regularly.

The Groundwater Contamination Maps for the State of Hawaii, 1998

Reports of drinking water contamination are based on current State Department of Health (DOH) monitoring data for public drinking water wells. Other reports of contamination used in this document are from the State Department of Agriculture, the Hawaii Agricultural Research Center, and historic DOH data which may not be consistent with current monitoring and analytical standards.

Summary

In general, the concentration of chemical contaminants found in our wells have been detected at levels below State and Federal drinking water standards. These levels do not pose a serious health risk. The water from drinking water wells with detected contaminant concentrations that are increasing are closely monitored. If contamination levels approach State and Federal drinking water regulatory limits, steps are taken to assure public health and safety such as treatment methods to reduce concentrations to acceptable levels, or removing the well from service.

The following is a listing by island of the contaminants that have been detected in groundwater: (Refer to the pages on Applicable Drinking Water Standards for definitions of the acronyms.)

Oahu:	Alachlor, Ametryn, Atrazine, Desethyl Atrazine, Despropyl Atrazine, Diamino Atrazine, Chlordane, Dieldrin, DBCP, DCP, EDB, PCE, TCE, and TCP.
Maui:	Ametryn, Atrazine, Desethyl Atrazine, Despropyl Atrazine, Diamino Atrazine, Diuron, DBCP, EDB, Simazine, and TCP.
Hawaii:	Atrazine, Desethyl Atrazine, Despropyl Atrazine, Diamino Atrazine, Hexazinone, and Simazine.
Kauai:	Ametryn, Atrazine, Desethyl Atrazine, and Simazine.
Molokai:	None
Lanai:	None.

Since the 1997 edition, no wells were taken off the maps because of the distinction between current and historic reporting. An addition for the 1998 edition is the Waipio Heights Wells on Oahu with detections of EDB and TCP. It should be noted that Carbon Tetrachloride was detected at the Kaluakoi Resort on Molokai in 1998, but a subsequent investigation found that detection of this contaminant did not occur at the groundwater source but occurred at locations on resort premises. Thus, the detection was not considered groundwater contamination.

The Groundwater Contamination Maps for the State of Hawaii, 1998

Definitions

The following are general definitions of the terms and abbreviations that are used in this report:

Concentration Level:

Refers to the amount of a contaminant found in a sample, the numerical values are presented in units of ppb (parts per billion).

ppb: This unit is commonly used as an equivalent to microgram per liter (ug/L). One ug/L is approximately a drop of contaminant in the volume of liquid contained in three Olympic size swimming pools.

Contaminant:

The contaminants identified in the report refer to chemical contaminants. DOH has defined contaminants as, "...any physical, chemical, biological, or radiological substance or matter in water. An additive contaminant under this definition may have a beneficial or detrimental effect on the potability of the water." (Hawaii Administrative Rules, Title 11, Department of Health, Chapter 20 Rules Relating to Potable Water Systems)

Detection Limit:

Refers to the lowest presence of a contaminant that can be detected by a laboratory through its testing equipment, analytical methods, and personnel.

ND:

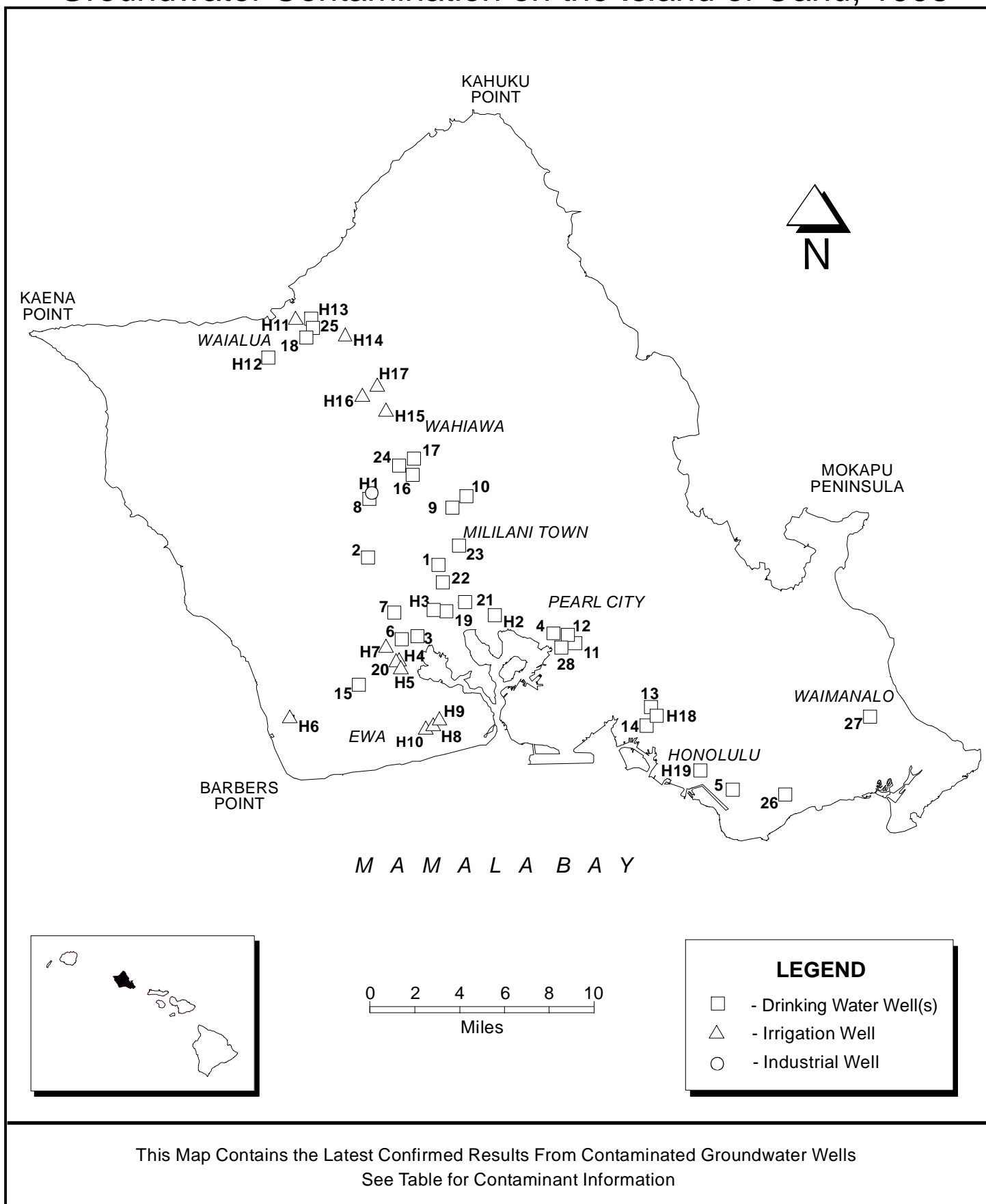
Refers to non-detectable, or no presence of a contaminant at or below the detection limit used by a laboratory.

NQ:

Refers to non-quantifiable, where a trace concentration of a contaminant was at a level greater than the detection limit but lower than the quantification limit used by a laboratory.

Quantification limit: refers to the level of contaminant concentration that can be confidently quantified by a laboratory's testing equipment, analytical methods, and personnel.

Groundwater Contamination on the Island of Oahu, 1998



GROUNDWATER CONTAMINATION ON THE ISLAND OF OAHU

NO.	WELL NAME	USE	CONTAMINANT		DETECTED LEVEL (in ppb)		DATE SAMPLED
1	Dairy Co. (2600-02)	DW	TCE		<0.5	NQ	8/27/98
			TCP		0.5		11/12/98
2	Hawaii Country Club (2603-01)	DW	DBCP	before treatment	0.06		12/1/98
				after treatment	<0.02	ND	12/1/98
			TCP	before treatment	<0.5	NQ	12/1/98
				after treatment	<0.2	ND	12/1/98
			EDB	before treatment	<0.04	NQ	8/25/98
				after treatment	<0.01	ND	8/25/98
3	Hoaeae (2301-34 to 39)	DW	TCP		<0.5	NQ	12/7/98
4	Kaamilo St., Wells (2356-58 and 59)	DW	Dieldrin		0.014		4/1/98
5	Kaimuki (1748-03 to 10)	DW	Dieldrin		0.015		11/4/98
6	Kunia Wells I (2302-01 to 04)	DW	Atrazine		0.068		11/6/98
			TCP		0.8		12/1/98
7	Kunia Wells II (2402-01,02,03)	DW	DBCP	before treatment	<0.04	NQ	12/7/98
				after treatment	<0.02	ND	12/7/98
			TCP	before treatment	1.1		12/7/98
				after treatment	<0.5	NQ	12/7/98
			TCE	before treatment	<0.5	NQ	12/21/98
				after treatment	Not available for 12/21/98		
8	Kunia Del Monte (2803-05 and 07)	DW	Carbon tetrachloride	before treatment	0.5		12/1/98
				after treatment	<0.2	ND	12/1/98
			TCE	before treatment	3.5		12/1/98
				after treatment	<0.2	ND	12/1/98
			DCP	before treatment	<1.0	NQ	12/1/98
				after treatment	<0.3	ND	12/1/98
9	Mililani I (2800-01 to 04)	DW	DBCP	before treatment	0.22		12/8/98
				after treatment	<0.02	ND	12/8/98
			DCP	before treatment	<1.0	NQ	12/8/98
				after treatment	<0.3	ND	12/8/98
			TCP	before treatment	3.2		12/8/98
				after treatment	<0.2	ND	12/8/98
10	Mililani II (2859-01 and 02)	DW	DBCP	before treatment	0.18		12/8/98
				after treatment	<0.02	ND	12/8/98
			DCP	before treatment	<1.0	NQ	12/8/98
				after treatment	<0.3	ND	12/8/98
			TCP	before treatment	2.1		12/8/98
				after treatment	<0.2	ND	12/8/98
11	BWS Halawa Wells Pump 1 and 2 (2255-39 and 37)(BWS Halawa Wells)	DW	Chlordane		<0.3	NQ	10/8/98
			Dieldrin		0.029		8/5/98
12	Aiea Wells (2355-06 and 07)	DW	Dieldrin		0.014		11/5/98

DW - Drinking Water Well(s)
IRR - Irrigation Well
IND - Industrial Well
UNU - Unused
NQ - Non-quantifiable
ND - Non-detected

GROUNDWATER CONTAMINATION ON THE ISLAND OF OAHU

NO.	WELL NAME	USE	CONTAMINANT		DETECTED LEVEL (in ppb)		DATE SAMPLED
13	Kamehameha Schools Wells 1 & 2 (2052-07 and 11) (only 2052-11 taken out of service)	DW	Chlordane		<0.3	NQ	4/1/98
			Dieldrin		0.046		11/16/98
14	Kalihi Pumping Station (1952-06 to 08, 16-19, 22)	DW	Dieldrin		0.012		10/13/98
15	Barbers Pt. Shaft (2103-03)	DW	Atrazine		0.088		10/14/98
16	Schofield Battery (2901-03, 04)	DW	TCE	before treatment	18.5		12/8/98
				after treatment	<0.5	NQ	12/8/98
			PCE	before treatment	<0.5	NQ	12/8/98
				after treatment	<0.2	ND	12/8/98
17	Wahiawa Wells (2901-08, 11, 12)	DW	Carbon Tetrachloride		<0.5	NQ	12/7/98
			PCE		<0.5	NQ	12/7/98
			DBCP		<0.04	NQ	8/25/98
18	Waialua Wells (3405-01, 02)	DW	TCE		<0.5	NQ	12/22/98
			TCP		<0.5	NQ	12/22/98
			DBCP		<0.04	NQ	8/27/98
19	Waipahu I (2400-01, 02, 03, 04)	DW	EDB	before treatment	<0.04	NQ	12/2/98
				after treatment	<0.01	ND	12/2/98
			TCP	before treatment	<0.5	NQ	12/2/98
				after treatment	<0.2	ND	12/2/98
			TCE	before treatment	<0.5	NQ	8/19/98
				after treatment	<0.2	ND	8/19/98
20	Waipahu II (2400-05, 06)	DW	EDB	before treatment	0.04	NQ	12/2/98
				after treatment	Not available for 12/2/98		
			TCP	before treatment	<0.5	NQ	12/2/98
				after treatment	Not available for 12/2/98		
<div>DW - Drinking Water Well(s) IRR - Irrigation Well IND - Industrial Well UNU - Unused NQ - Non-quantifiable ND - Non-detected</div>							
21	Waipio Hts. (2459-20)	DW	EDB		<0.04	NQ	12/1/98
			TCP		<0.5	NQ	12/1/98
22	Waipio Hts. II (2500-01, 02) (Taken out of service)	DW	TCE		<0.5	NQ	11/13/98
			TCP		0.8		11/13/98
23	Waipio Hts. Wells III (2659-03) (Taken out of service)	DW	EDB		<0.04	NQ	1/22/98
			TCP		0.6		11/13/98
24	Wahiawa Wells II (2902-01)	DW	Carbon Tetrachloride		<0.5	NQ	12/8/98
			PCE		0.5	NQ	12/8/98
			TCP		<0.5	NQ	12/8/98
25	Haleiwa Wells (3405-03, 04)	DW	DBCP		0.04		12/15/98
			TCP		<0.5	NQ	12/15/98
			TCE		<0.5	NQ	9/9/98

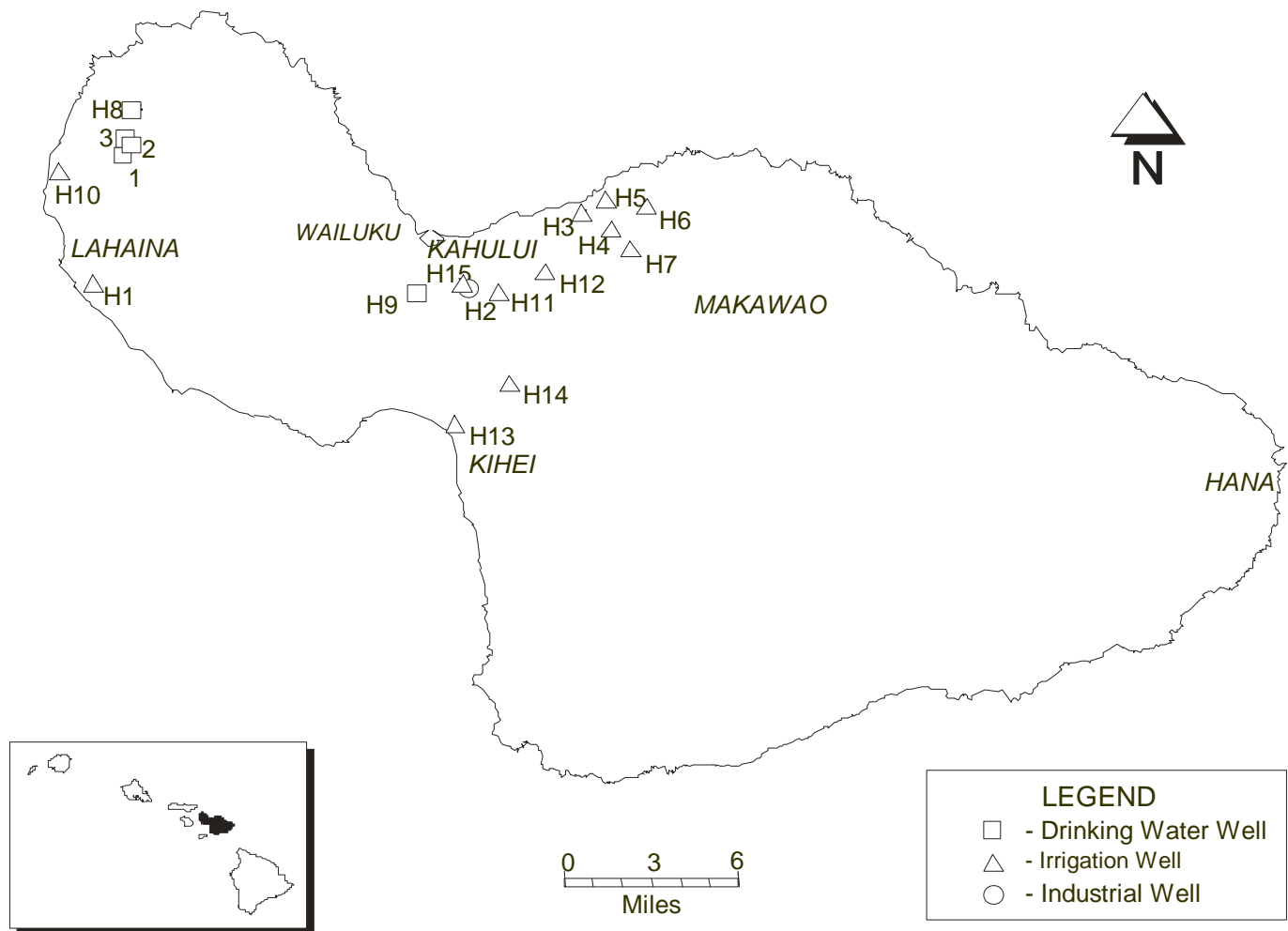
GROUNDWATER CONTAMINATION ON THE ISLAND OF OAHU

NO.	WELL NAME	USE	CONTAMINANT	DETECTED LEVEL (in ppb)	DATE SAMPLED
26	Aina Koa Well (1746-01)	DW	Dieldrin	0.013	11/4/98
27	Waimanalo Well I (2043-02) (taken out of service)	UNU	Alachlor	0.53	1/27/98
28	Aiea Halawa Shaft (2255-32) (Navy Halawa Shaft)	DW	Chlordane Dieldrin	<0.30 0.011	NQ 1/9/98 4/7/98
<p>The following are wells that have historic monitoring information and are identified as (No.)H and H #. (No.)H refers to wells currently in use listed by No. on the preceding list. H # refers to wells that may or may not be currently used.</p>					
(3)H	Hoaeae (2301-34 to 39)	DW	Atrazine Desethyl Atrazine	0.063 <0.10	8/28/96 9/28/93
(4)H	Kaamilo St., Wells (2356-58 and 59)	DW	PCE	0.03	4/20/85
(5)H	Kaimuki (1748-03 to 10)	DW	PCE	* 0.03	4/23/85
* Samples taken after this date do not show the presence of this contaminant. Methodology changes raised the detection for PCE from 0.01ppb to 0.2ppb.					
(6)H	Kunia Wells I (2302-01 to 04)	DW	Desethyl Atrazine TCP	<0.10 0.7	9/28/93 5/21/97
(7)H	Kunia Wells II (2402-01,02,03)	DW	Atrazine Desethyl Atrazine	<0.10 <0.10	9/28/93 9/28/93
(15)H	Barbers Pt. Shaft (2103-03)	DW	Desethyl Atrazine	0.17	10/28/92
(28)H	Aiea Halawa Shaft (2255-32) (Navy Halawa Shaft)	DW	Chlordane	<0.30	7/8/97
H1	Kunia Battery (2803-03 and 04)	IND	Atrazine Desethyl Atrazine PCE TCE	0.05 0.05 1.65 3.7	NQ NQ 4/23/85 7/24/85
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> DW - Drinking Water Well(s) IRR - Irrigation Well IND - Industrial Well UNU - Unused NQ - Non-quantifiable ND - Non-detected </div>					
H2	Manana (2458-01)	DW	PCE	* 0.03	4/18/85
* Samples taken after this date do not show the presence of this contaminant. Methodology changes raised the detection for PCE from 0.01ppb to 0.2ppb.					
H3	OSCO Ewa Pump 3 (2202-03)	UNU	Atrazine Desethyl Atrazine	<0.10 0.13	NQ 11/10/92 11/10/92
H4	OSCO Ewa Pump 5 (2202-05)	UNU	Atrazine Desethyl Atrazine	0.15 0.14	11/10/92 11/10/92
H5	OSCO Ewa Pump 7A (2202-15) (also called Pump 8)	UNU	Atrazine Desethyl Atrazine	<0.10 <0.10	NQ NQ 11/10/92 11/10/92

GROUNDWATER CONTAMINATION ON THE ISLAND OF OAHU

NO.	WELL NAME	USE	CONTAMINANT	DETECTED LEVEL (in ppb)	DATE SAMPLED
H6	OSCO Ewa Pump 10 (2006-01 to 11)	UNU	Atrazine Desethyl Atrazine	<0.10 0.15	NQ 11/17/92 11/17/92
H7	OSCO Ewa Pump 15 (2202-21)	UNU	Atrazine Desethyl Atrazine	0.15 0.12	11/17/92 11/17/92
H8	OSCO Ewa Pump 20 (1900-01)	UNU	Atrazine Desethyl Atrazine Despropyl Atrazine Diamino Atrazine Ametryn	0.71 1.2 0.13 0.22 0.05	11/16/93 11/16/93 11/16/93 11/16/93 NQ 11/10/92
H9	OSCO Ewa Pump 21 (2000-01)	UNU	Atrazine Desethyl Atrazine Despropyl Atrazine Diamino Atrazine	0.77 1 0.13 0.25	11/16/93 11/16/93 11/16/93 11/16/93
H10	OSCO Ewa Pump 24 (1901-01)	UNU	Atrazine Desethyl Atrazine Despropyl Atrazine Diamino Atrazine Ametryn	1.10 1.59 0.21 0.50 0.11	11/10/92 11/10/92 11/10/92 11/10/92 11/10/92
H11	Haleiwa Battery (3506-03)	IRR	Atrazine Lindane	0.13 0.002	11/4/92 11/12/87
H12	Waialua P2 Battery (3307-01)	DW	Atrazine Desethyl Atrazine	0.12 0.15	11/4/92 11/4/92
H13	Waialua Sugar P3 (3505-01 to 20)	DW	DBCP TCP	<0.04 <0.5	NQ NQ 7/24/97 7/24/97
H14	Waialua Sugar P17 (3404-02)	IRR	DBCP TCP	0.06 1.1	11/9/93 11/9/93
H15	Waialua Sugar P24 (3102-02)	IRR	DBCP TCP	0.020 0.500	8/20/84 6/3/85
H16	Waialua Sugar P25 (3203-01)	IRR	DBCP	0.115	6/7/83
H17	Waialua Sugar P26 (3203-02)	IRR	DBCP TCP	0.012 0.800	6/3/85 6/3/85
H18	Jonathan Springs Well (2025-12)	UNU	Chlordane Dieldrin	0.3 0.06	11/8/95 11/8/95
H19	Wilder Well 1 (1849-14)	DW	Dieldrin	0.01☆	2/19/97
<div> DW - Drinking Water Well(s) IRR - Irrigation Well IND - Industrial Well UNU - Unused NQ - Non-quantifiable ND - Non-detected </div>			☆ - latest monitoring results do not show the presence of this contaminant. This well will be removed from the list If the contaminant is not detected in subsequent monitoring (ideally through one annual weather cycle, including wet and dry seasons).		

Groundwater Contamination on the Island of Maui, 1998



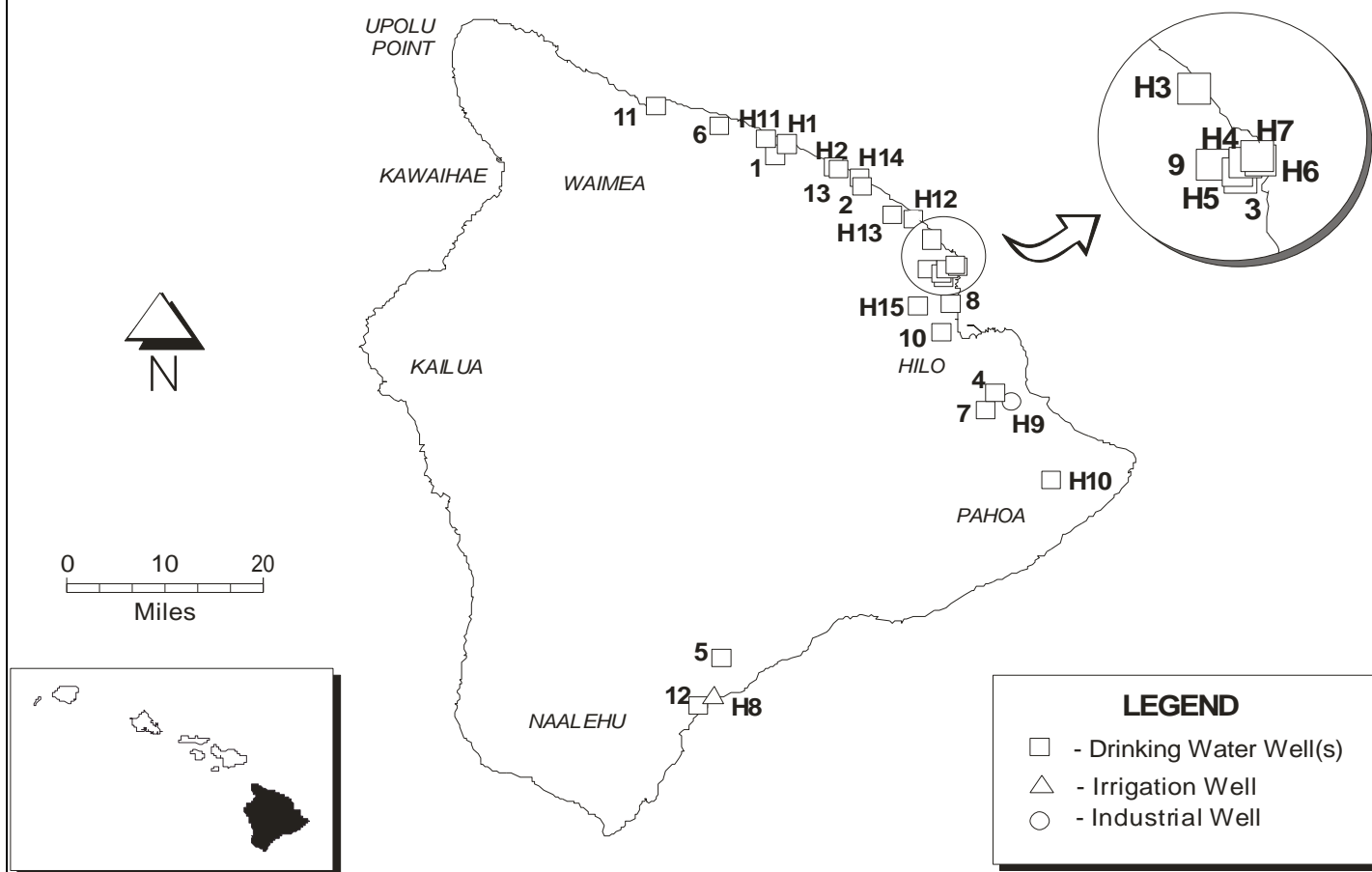
This map contains the latest confirmed results from contaminated groundwater wells

NO.	WELL NAME	USE	CONTAMINANT		DETECTED LEVEL (in ppb)		DATE SAMPLED
1	Kaanapali P4 (5739-01)	DW	TCP	before treatment	0.5		12/10/98
				after treatment	<0.2	ND	12/10/98
			DBCP	before treatment	0.04	*	11/30/98
				after treatment	<0.02	ND	11/10/98
2	Kaanapali P5 (5738-01)	DW	TCP	before treatment	1.4		12/10/98
				after treatment	<0.2	ND	12/10/98
			DBCP	before treatment	0.18		11/10/98
				after treatment	<0.02	ND	11/10/98
3	Kaanapali P6 (5739-02)	DW	TCP	before treatment	0.8		12/10/98
				after treatment	<0.2	ND	12/10/98
			DBCP	before treatment	0.12		11/10/98
				after treatment	<0.02	ND	11/10/98
<div>DW - Drinking Water Well(s) IRR - Irrigation Well IND - Industrial Well UNU - Unused NQ - Non-quantifiable ND - Non-detected</div> <div>* -resample of 11/10/98</div>							

GROUNDWATER CONTAMINATION ON THE ISLAND OF MAUI

NO.	WELL NAME	USE	CONTAMINANT	DETECTED LEVEL (in ppb)	DATE SAMPLED
<p>The following are wells that have historic monitoring information and are identified as (No.)H and H #. (No.)H refers to wells currently in use listed by No. on the preceding list. H # refers to wells that may or may not be currently used.</p>				<div style="border: 1px solid black; padding: 5px;"> DW - Drinking Water Well(s) IRR - Irrigation Well IND - Industrial Well UNU - Unused NQ - Non-quantifiable ND - Non-detected </div>	
H1	Lahaina Pump A (5440-02)	IRR	Atrazine	0.11	11/2/83
H2	Puunene Pump 7A (5227-04)	IND	Atrazine EDB	1.0 0.040	7/29/85 3/12/85
H3	Lower Paia #16 (5423-02)	IRR	Atrazine	0.18 ◇	3/11/97
H4	Paia #7 (5422-02)	IRR	Atrazine EDB	0.23 ◇ 0.028	3/11/97 3/4/85
H5	Kuau Pump 12 (5522-01)	IRR	TCP	0.430	3/4/85
H6	Maui High School (Old) (5420-01)	IRR	DBCP EDB TCP	0.091 0.067 0.430	3/4/85 3/4/85 3/4/85
H7	Kaheka #18 (5321-01)	IRR	DBCP EDB TCP	0.018 0.050 0.13	8/16/89 8/16/89 8/16/89
H8	Napili A (Closed) (5838-01)	DW	DBCP	0.360	6/4/93
H9	Maui Reynolds Well #1 (5228-06) (taken out of service)	DW	DBCP	<0.040	NQ 2/16/93
H10	Kaanapali Pump D (5641-01)	IRR	Atrazine Ametryn Despropyl Atrazine Diamino Atrazine Simazine	1.66 ◇ 1.4 0.12 0.15 0.82	3/11/97 6/1/93 6/1/93 6/1/93 6/1/93
H11	Puunene Pump 6 (5226-02)	IRR	Atrazine Desethyl Atrazine	0.47 ◇ 0.23	3/11/97 3/15/94
H12	Puunene Pump 9 (5224-02)	IRR	Atrazine Desethyl Atrazine	0.09 ◇ <0.10	3/11/97 NQ 6/15/93
13H	Kihei Well 1 (4727-01)	IRR	Atrazine Ametryn Desethyl Atrazine Diamino Atrazine	0.54 ◇ <0.10 0.32 <0.10	3/11/97 NQ 6/22/93 6/22/93 NQ 6/22/93
14H	Kihei Well 3 (4825-01)	IRR	Atrazine Desethyl Atrazine	0.35 ◇ 0.19 ◇	3/11/97 3/15/94
15H	Puunene Mill Pump 19 (5227-05)	IRR	Atrazine Ametryn Desethyl Atrazine Diamino Atrazine	0.45 ◇ <0.10 ◇ 0.33 <0.10	3/11/97 NQ 6/22/93 3/15/94 NQ 6/22/93
◇ - DOA Immunoassay analysis					

Groundwater Contamination on the Island of Hawaii, 1998



This map contains the latest confirmed results from contaminated groundwater wells

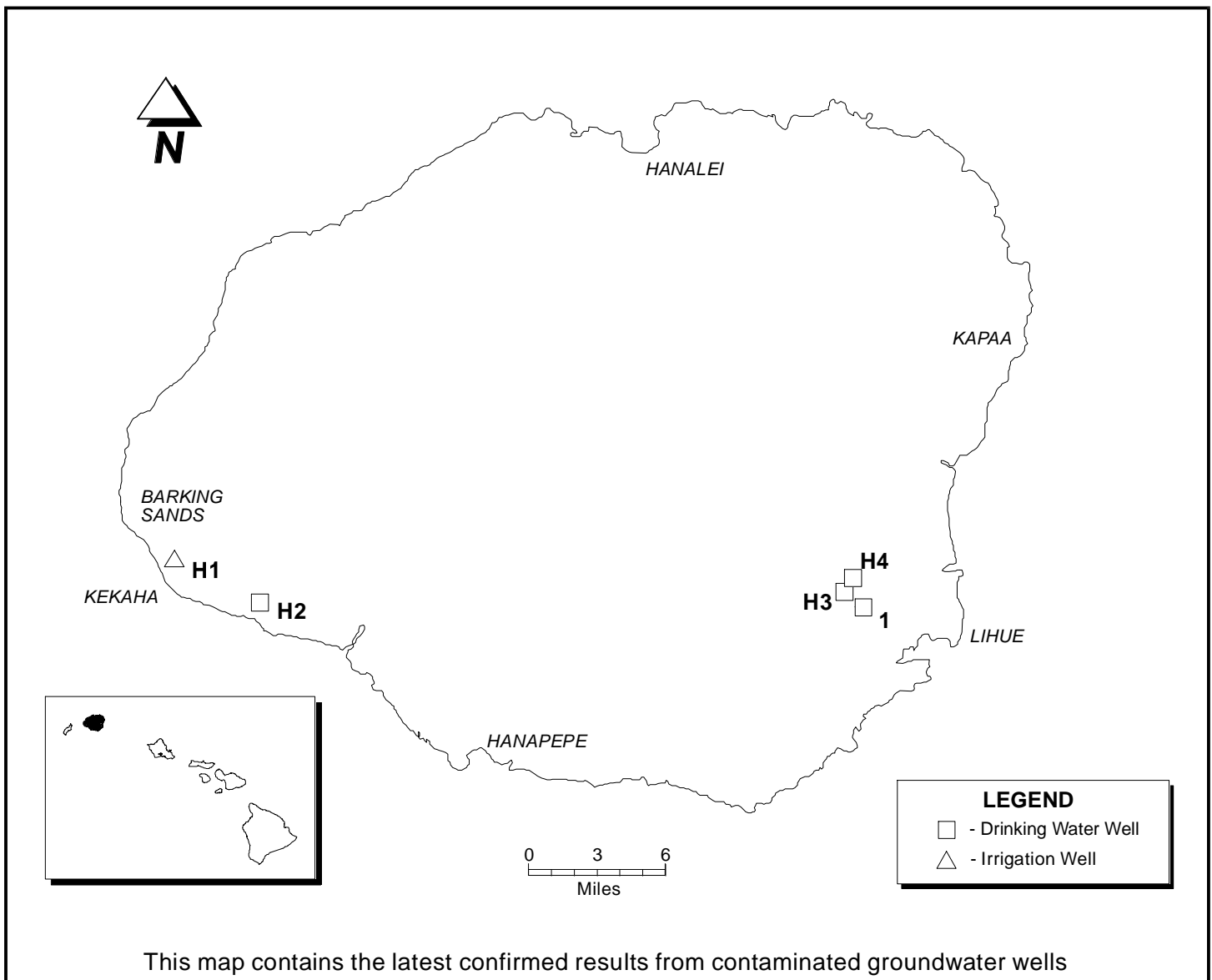
NO.	WELL NAME	USE	CONTAMINANT	DETECTED LEVEL (in ppb)	DATE SAMPLED
1	Paauilo Well (6223-01)	DW	Atrazine	0.62	10/8/98
2	Laupahoehoe Wells (5814-01, 02)	DW	Atrazine	0.20	10/8/98
3	Kulaimano (5006-01)	DW	Atrazine	0.37	10/8/98
4	Keeau 1 (3802-01)	DW	Atrazine	0.061	1/15/98
5	Pahala (1229-01)	DW	Atrazine	0.24	10/14/98
6	Haina Well (6528-01)	DW	Atrazine	0.1	10/8/98
7	Olaa 3 (3603-01)	DW	Atrazine	0.061	11/13/98
8	Chaves Spring (5610-)	DW	Atrazine	0.350	10/8/98
9	Maukaloa Spring (5006-)	DW	Atrazine Simazine	0.23 0.11	10/8/98 10/8/98

GROUNDWATER CONTAMINATION ON THE ISLAND OF HAWAII (continued)

NO.	WELL NAME	USE	CONTAMINANT	DETECTED LEVEL (in ppb)	DATE SAMPLED
10	Kaiele Spring (4708-)	DW	Atrazine	0.380	10/8/98
11	Waiuliuli Spring (6734-01)	DW	Atrazine	0.220	10/8/98
12	Ninole A and B (0831-02, 03)	DW	Atrazine	0.097	10/13/98
13	Ookala Well (6017-05)	DW	Atrazine	0.590	10/8/98
<p>The following are wells that have historic monitoring information and are identified as (No.)H and H #. (No.)H refers to wells currently in use listed by No. on the preceding list. H # refers to wells that may or may not be currently used.</p>					
(2)H	Laupahoehoe Wells (5814-01, 02)	DW	Desethyl Atrazine	0.82	1/12/93
			Despropyl Atrazine	0.23	1/12/93
			Diamino Atrazine	0.17	1/12/93
			Hexazinone	1.3	9/25/90
(3)H	Kulaimano (5006-01)	DW	Hexazinone	0.3	8/5/91 _R
			Diuron	0.6	8/5/91 _R
(4)H	Keeau 1 (3802-01)	DW	Desethyl Atrazine	0.03	NQ 12/15/92
(5)H	Pahala (1229-01)	DW	Desethyl Atrazine	0.19	12/18/92
(6)H	Haina Well (6528-01)	DW	Desethyl Atrazine	0.38	1/12/93
			Diamino Atrazine	0.11	1/12/93
(7)H	Olaa 3 (3603-01)	DW	Desethyl Atrazine	0.06	12/21/93
(9)H	Maukaloa Spring (5006-)	DW	Hexazinone	0.56	9/24/86
(11)H	Waiuliuli Spring (6734-01)	DW	Hexazinone	0.72	9/9/85
H1	Paauilo Shaft (6321-02)	DW	Atrazine	0.590	2/28/95
			Hexazinone	1.10	9/9/86
H2	Ookala Shaft (6117-07) (taken out of service)	DW	Atrazine	0.60	9/11/96
			Desethyl Atrazine	1.00	1/12/93
			Despropyl Atrazine	0.16	1/12/93
			Diamino Atrazine	0.15	1/12/93
H3	Hakalau School Well (5307-01)	DW	PCE	0.130 ⁺	5/6/85
<p>⁺ - Samples taken since this date do not show the presence of this contaminant. Methodology changes raised the detection limit for PCE from 0.01 ppb to 0.2</p>				<p>R - date received by lab</p>	
				<p>DW - Drinking Water Well(s) IRR - Irrigation Well IND - Industrial Well UNU - Unused NQ - Non-quantifiable ND - Non-detected</p>	

NO.	WELL NAME	USE	CONTAMINANT	DETECTED LEVEL (in ppb)	DATE SAMPLED
H4	Pepeekeo Sugar Makai (5005-01) (HCPC Lower Well)	DW	Atrazine Desethyl Atrazine Hexazinone Diuron	<0.500 NQ 0.8 0.3 0.5	1/22/96 12/14/93 8/5/91 R 8/5/91 R
H5	Pepeekeo Sugar (5005-02) (HCPC Upper Well)	DW	Atrazine Desethyl Atrazine Despropyl Atrazine Diamino Atrazine Hexazinone Diuron	<0.500 NQ 1.2 0.15 0.14 0.9 0.8	1/22/96 12/14/93 12/14/93 12/14/93 8/5/91 R 8/5/91 R
H6	HCPC Makai Well 2 (5005-03)	DW	Atrazine Desethyl Atrazine	0.27 0.22	12/1/92 12/1/92
H7	HPPC Makai Well (5005-04)	DW	Atrazine Desethyl Atrazine	0.05 0.07	12/14/93 12/14/93
H8	Punaluu Th-2 (0830-02)	IRR	Atrazine Desethyl Atrazine	0.12 0.16	12/21/93 12/21/93
H9	Keeau (1938-07)	IND	Atrazine Ametryn	0.260 0.880	2/27/84 2/27/84
H10	Pahoa Battery (2986-01 and 02) (Pahoa Deep Well, Pump 1 and 2)	DW	Atrazine Desethyl Atrazine Diuron	0.5 NQ 0.5 NQ 0.8	12/15/92 12/15/92 8/5/91
H11	Big Island Meat Co. (6323-01)	DW	Atrazine Desethyl Atrazine Despropyl Atrazine Diamino Atrazine	<0.500 NQ 0.55 0.15 0.12	1/22/96 1/12/93 1/12/93 1/12/93
H12	Kaiaakea Spring (5611-)	DW	Hexazinone	0.47	9/9/86
H13	Kihalani Spring (5613-)	DW	Hexazinone	0.57	9/9/86
H14	Manowaiopae Spring (5814-)	DW	Atrazine	0.14	10/23/96
H15	Papaaloa Spring (5713-)	DW	Atrazine	0.560	2/28/95
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> DW - Drinking Water Well(s) IRR - Irrigation Well IND - Industrial Well UNU - Unused NQ - Non-quantifiable ND - Non-detected </div>				R - date received by lab	

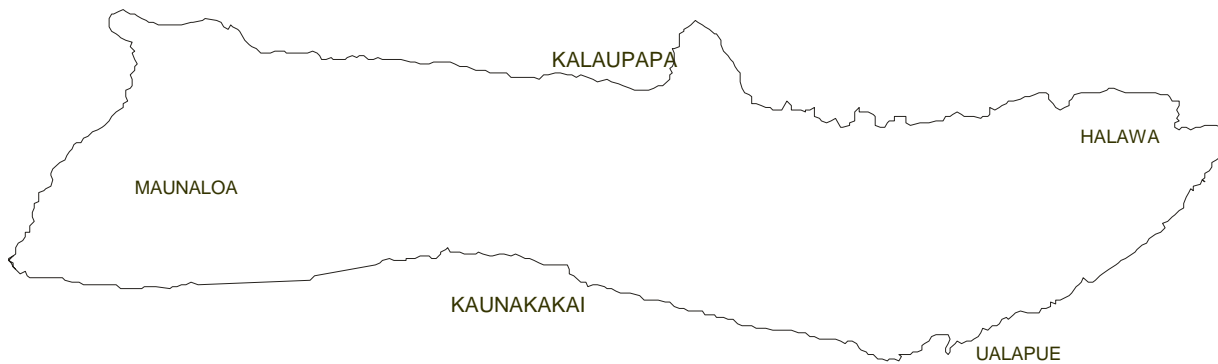
Groundwater Contamination on the Island of Kauai



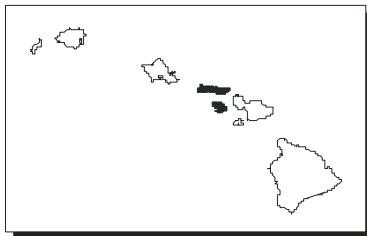
NO.	WELL NAME	USE	CONTAMINANT	DETECTED LEVEL (in ppb)	DATE SAMPLED
1	Garlinghouse Tunnel (5823-01)	DW	Atrazine	0.053	10/7/1998
<p>The following are wells that have historic monitoring information and are identified as (No.)H and H#. (No.)H refers to wells currently in use listed by No. on the preceding list. H# refers to wells that may or may not be currently used.</p>				<div style="border: 1px solid black; padding: 5px;"> DW - Drinking Water Well(s) IRR - Irrigation Well IND - Industrial Well NQ - Non-quantifiable ND - Non-detected </div>	
(1)H	Garlinghouse Tunnel (5823-01)	DW	Desethyl Atrazine	<0.10	NQ 3/9/1993

NO.	WELL NAME	USE	CONTAMINANT	DETECTED LEVEL (in ppb)	DATE SAMPLED
H1	Barking Sands (0045-04)	IRR	Atrazine	3.5	7/12/88
			Ametryn	0.80	7/12/88
			Simazine	0.20	7/12/88
H2	Paua Valley 2 (5942-01)	DW	Atrazine	0.06 ◇	8/20/97
H3	Kilohana C (5923-03)	DW	Atrazine	0.15 ◇	8/20/97
H4	Kilohana G (5923-05)	DW	Atrazine	0.22 ◇	8/20/97
				◇ - DOA Immunoassay analysis	

Groundwater Contamination on Molokai and Lanai



Kalohi Channel



KAENA
POINT

KUAHUA

LANAI
CITY

KAUMALAPAU
HARBOR

MANELE
BAY



This map contains the latest confirmed results from contaminated groundwater wells

NO.	WELL NAME	USE	CONTAMINANT	DETECTED LEVEL (in ppb)	DATE SAMPLED
NO CONFIRMED CONTAMINANTS DETECTED					

Applicable Drinking Water Standards, Possible Health Effects and Potential Sources of Groundwater Contamination

<u>Common Name</u>	<u>Applicable Drinking Water Standards (in ppb) (3)</u>		<u>Possible Noncarcinogenic Effects. Based on Ingestion Effects on Animals (1)</u>	<u>EPA Carcinogen Rating (2)</u>	<u>Potential Contamination Sources</u>
Alachlor	2	MCL	Damaged red blood cells, causing kidney and spleen damage	Probable	Herbicide
Ametryn	60	LHA	Liver Damage	Unclassified	Herbicide
Atrazine Desethyl Atrazine Despropyl Atrazine Diamino Atrazine	3	MCL	Heart and liver damage; fetal/child development retarded	Possible	Herbicide
Carbon Tetrachloride	5	MCL	Liver, kidney, and lung damage	Probable	Solvent, dry cleaning agent
Chlordane	2	MCL	Central nervous system, liver, kidney damage	Unclassified	Pesticide (termiticide)
1,2 Dibromo-3-chloropropane (DBCP)	0.04	SMCL	Male reproductive system, liver, and kidney damage	Probable	Pesticide (soil fumigant)
1,1-Dichloroethylene (DCE)	7	MCL	Central nervous system depression; a heart effect; liver and kidney damage	Possible	Solvent
1,2-Dichloropropane (DCP)	5	MCL	Gastrointestinal irritation, liver and kidney damage	Probable	Pesticide, Solvent
Dieldrin	0.002	10 ⁻⁶	Central nervous system, liver, and kidney damage	Probable	Pesticide
Diuron	10	LHA	Central nervous system depression; damaged red blood cells, causing spleen damage; altered fetal development	Unclassified	Herbicide
Ethylene dibromide (EDB)	0.04	SMCL	Male reproductive system, liver, gastrointestinal, and adrenal gland damage	Probable	Gas additive, soil fumigant, solvent
Hexazinone	200	LHA	Reduced body weight or possibly reduced growth	Unclassified	Herbicide
Lindane	0.2	MCL	Nerve damage and central nervous system seizures; liver and kidney damage; suppression of the immune system	Probable	Insecticide

(1) Based on Health Advisories from the USEPA's Office of Drinking Water

(2) Based on estimates from the USEPA's Health Hazard Assessment Group

(3) See next page for definitions of Applicable Drinking Water Standards

Applicable Drinking Water Standards, Possible Health Effects and Potential Sources of Groundwater Contamination (continued)

<u>Common Name</u>	<u>Applicable Drinking Water Standards (in ppb) (3)</u>		<u>Possible Noncarcinogenic Effects. Based on Ingestion Effects on Animals (1)</u>	<u>EPA Carcinogen Rating (2)</u>	<u>Potential Contamination Sources</u>
Simazine	4	MCL	Liver, kidney, and brain damage	Possible	Herbicide
Tetrachloro-ethylene (PCE)	5	MCL	Central nervous system depression; liver and kidney damage	Probable	Solvent, dry cleaning agent
Trichloro-ethylene (TCE)	5	MCL	Central nervous system depression; a heart effect; liver and kidney damage	Probable	Solvent
1,2,3-Trichloro-propane (TCP)	0.8	SMCL	Decreased red blood cells; liver and kidney damage	Unclassified	Solvent, trace contaminant in certain pesticides

- (1) Based on Health Advisories from the USEPA's Office of Drinking Water
(2) Based on estimates from the USEPA's Health Hazard Assessment Group
(3) See below for definitions of Applicable Drinking Water Standards

(3) Definition of Applicable Drinking Water Standards

"MCL"

means a maximum contaminant level or the maximum permissible level of a contaminant in water which is delivered to any user of a public water system. MCLs are the only federally enforceable drinking water standards.

"Lifetime Health Advisory" (LHA)

describes a non-regulatory concentration of a drinking water contaminant at which adverse health effects would not be anticipated to occur over a lifetime exposure of 70 years duration. The advisories are based on data describing non-carcinogenic risk from such exposure. This is a non-regulatory standard.

"SMCL"

describes the State's maximum contamination level (which may be more stringent than the MCL) of a contaminant in water and applies to community and non-transient non-community water systems, as defined in Hawaii Administrative Rules, Title 11, Department of Health, Chapter 20 - Rules Relating to Potable Water Systems.

"10⁻⁶"

indicates those chemicals which EPA considers to be potential human carcinogens. EPA estimates a "cancer risk level" as the level at which an individual who consumes water over his or her lifetime (70 years) would have no more than a one-in-a-million chance of developing cancer as a direct result of drinking water containing the contaminant. This is a non-regulatory standard.